

PATENT ABSTRACTS OF JAPAN

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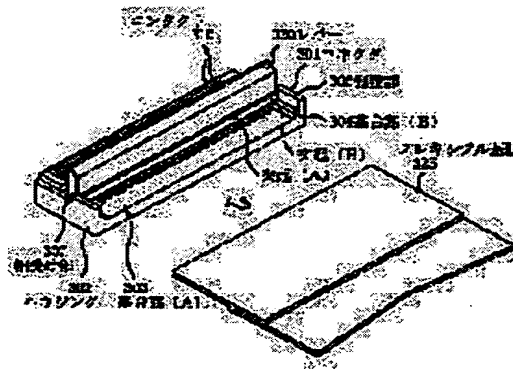
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(54) CONNECTOR FOR FLEXIBLE BASE PLATE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a connector for a flexible base plate, having good operability and high reliability, and capable of withstanding repeated mounting.

SOLUTION: A lever 320 is provided with a protrusion (A) 322 for pressing a flexible base plate 325 against the contact part of a contact 310 on the same straight line as the rotational center after the rotation of the lever, and a protrusion (B) to be brought into contact with a base table part (B) 304 provided on a housing 302 so as to climb over it during the rotation of the lever. No lock is necessary for the lever to be rotated in mounting of the flexible base



plate, so that damages to the flexible base plate by pressing force can be reduced.

CLAIMS

[Claim(s)]

[Claim 1] Housing in which the path of insertion of a flexible substrate was made the cross direction, and the upper part carried out opening, Two or more contacts which have the contact segment, the lead terminal, and the piece of elastic support in which the contact surface which is prolonged towards the front from the back of this housing, and is electrically connected with said flexible substrate at that tip was prepared, and were attached in said housing from the back side, In the connector for flexible substrates which has the lever which is supported free [rotation] above said housing, and presses and fixes said flexible substrate to this housing in a predetermined rotation location The projection said whose lever presses said flexible substrate in said contact, When it has the projection which contacts so that it may get over to the field established in said housing in the rotation process of a lever, and the stop section which curved to the rotation core side of a lever and this stop section and the point of the piece of elastic support of said contact fit in The connector for flexible substrates characterized by rotating the point of said piece of elastic support as a core.

[Claim 2] Housing in which the path of insertion of a flexible substrate was made order, and the upper part carried out opening, Two or more contacts which have the contact segment, the lead terminal, and the piece of elastic support in which the contact surface which is prolonged towards the front from the back of this housing, and is electrically connected with said flexible substrate at that tip was prepared, and were attached in said housing from the back side, In the connector for flexible substrates which has the lever which is supported free [rotation] above said housing, and presses and fixes said flexible substrate to this housing in a predetermined rotation location Said housing has the flat substrate section in which a flexible substrate is inserted, and the substrate section higher than said flat substrate section prepared in the both ends. Said lever The projection which presses a flexible substrate in said contact, and the projection which contacts so that it may get over on the top face of said high substrate section in the rotation process of a lever, The connector for flexible substrates characterized by rotating the point of said piece of elastic support as a core when it has the stop section which curved to the rotation core side of a lever and this stop section and the point of the piece of elastic support of said contact fit in.

[Claim 3] Housing in which the path of insertion of a flexible substrate was made the cross direction, and the upper part carried out opening, Two or more contacts which have the contact fixed piece and lead terminal strip in which the contact surface which is prolonged towards the front from the back of this housing, and is electrically

connected with said flexible substrate at that tip was prepared, and a piece of elastic support, and were attached in said housing from the back side, In the connector for flexible substrates which has the lever which is supported free [rotation] above said housing, and presses and fixes said flexible substrate to this housing in a predetermined rotation location Said contact is a connector for flexible substrates characterized by having two contact surfaces electrically connected with said flexible substrate.

[Claim 4] The connector for flexible substrates according to claim 3 characterized by arranging the rotation core of the lever which presses and fixes said flexible substrate, and said two contact surfaces at the physical relationship of an isosceles triangle.

[Claim 5] Housing in which the path of insertion of a flexible substrate was made the cross direction, and the upper part carried out opening, Two or more contacts which have the contact fixed piece and lead terminal strip in which the contact surface which is prolonged towards the front from the back of this housing, and is electrically connected with said flexible substrate at that tip was prepared, and a piece of elastic support, and were attached in said housing from the back side, In the constituted connector for flexible substrates the lever which is supported free [rotation] above said housing, and presses and fixes said flexible substrate to this housing in a predetermined rotation location -- since -- It is the connector for flexible substrates characterized by for said lever having the projection which presses said flexible substrate in said contact, and the projection which contacts so that it may get over to the field established in said housing in the rotation process of a lever, and said contact fixed piece having two contact surfaces.

[Claim 6] Housing in which the path of insertion of a flexible substrate was made the cross direction, and the upper part carried out opening, Two or more contacts which have the contact fixed piece and lead terminal strip in which the contact surface which is prolonged towards the front from the back of this housing, and is electrically connected with said flexible substrate at that tip was prepared, and a piece of elastic support, and were attached in said housing from the back side, In the constituted connector for flexible substrates the lever which is supported free [rotation] above said housing, and presses and fixes said flexible substrate to this housing in a predetermined rotation location -- since -- Said housing has the flat substrate section in which a flexible substrate is inserted, and the substrate section higher than said flat substrate section prepared in the both ends. Said lever It is the connector for flexible substrates characterized by having the projection which presses a flexible substrate in said contact, and the projection which contacts so that it may get over on the top face of said high substrate section in the rotation process of a lever, and

said contact fixed piece having two contact surfaces.

[Claim 7] Two contact surfaces, the rotation core of the lever which presses and fixes said flexible substrate, and said contact fixed piece, are connectors for flexible substrates according to claim 5 or 6 characterized by being arranged at the physical relationship of an isosceles triangle.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the small connector for flexible substrates from which dependability with it is acquired, in case it is especially mounted in a printed circuit board etc., the connector for flexible substrates, and, [good and workability and] [high]

[0002]

[Description of the Prior Art] Conventionally, in the connector for flexible substrates mounted and used for a printed circuit board etc., high-density-assembly-izing, a miniaturization and high workability, and high-reliability are demanded, and this kind of object for flexible substrates or the example of the connector for flat cables is indicated by JP,9-82427,A and JP,6-77186,U.

[0003] Drawing 8 shows a connector given in JP,9-82427,A, and drawing 8 (A) - (C) shows the process in which it equips with a flat cable. The housing 102 with which the upper part carried out opening of the connector 101 as shown in this drawing, Two or more contact 103a which has contact section 104a and lead terminal strip 105a in which contact-surface 106a which is prolonged towards back from the front of housing 102, and is electrically connected with a flat cable (not shown) at the tip was prepared, and was attached in housing 102 from the front side, Two or more contact 103b which has contact segment 104b and lead terminal strip 105b in which contact-surface 106b which is prolonged towards the front from the back of housing 102, and is electrically connected with a flat cable at the tip was prepared, and was attached in housing 102 from the back side, the lever 108 which it is supported free [rotation] above housing 102, and presses a flat cable and is fixed to housing 102 in a predetermined rotation location -- since -- it is constituted. And the line which connects contact-surface 106of contact-surface 106a and contact 103b of rotation

core [of a lever 108] 107 and contact 103a b is making the isosceles triangle.

[0004] Moreover, drawing 9 shows the connector of a publication to JP,6-77186,U. The housing 202 with which the upper part carried out opening of the connector 201 as shown in this drawing, The pressurization member 210 which carries out pressurization immobilization of the flexible substrate 209 inserted in the interior of housing 202, It is constituted by the contact 203 which unified the lead terminal area 206 for the electrical installation to the U character-like connection 205 and the exterior for connecting with the rotation supporter 204 and the flexible substrate 209 of the pressurization member 210 in the arm section 207. Contact 203 is attached from the back of housing 202, and the pressurization member 210 is attached so that it may rotate centering on the tip of the rotation supporter 204. And the pressurization projected part 211 in the pressurization member 210 is located outside the line which connects the tip core of the rotation supporter 204, and the contact surface 208 of contact 203, when the pressurization member 210 is in an open condition, and when the pressurization member 210 rotates to a position, it is set up so that it may be located inside this line.

[0005]

[Problem(s) to be Solved by the Invention] Although drawing 10 shows the operating physical force of the lever 108 at the time of equipping JP,9-82427,A with the flat cable of the connector of a publication, it can say the following thing to JP,6-77186,U similarly in the connector of a publication.

[0006] The operating physical force of the pressurization member 210 which both the conventional examples mentioned above equip with the operating physical force or the flexible substrate 209 of a lever 108 at the time of equipping with a flat cable became like the graph shown in drawing 1010 , and the self lock function has produced it. And it can consider that the axis of ordinate of this graph is the force, i.e., contact force, in which the force in which a lever 108 presses a flat cable, or the pressurization member 210 presses the flexible substrate 209, and it is possible that the self lock function has been obtained using contact force.

[0007] The problem in these two conventional examples is the point that contact force to set up as most importantly [when securing and maintaining the property as a connector] highly as possible cannot be set up at the time of actuation of a lever 108, or actuation termination of the pressurization member 210.

[0008] As for the reason, contact force has [it / the force at the time of actuation of a lever 108, or actuation termination of the pressurization member 210, and] the force for obtaining a high self lock function from a graph. On the structure where both the conventional examples have put the flat cable or the flexible substrate 209 by

contact force, From the highest force joining a flat cable or the flexible substrate 209, in the middle of actuation When the force which can carry out the maximum permissible of a flat cable or the flexible substrate 209 is made into the force for obtaining a self lock function, i.e., the highest force generated in the middle of actuation, it is because the force at the time of actuation of a lever 108 or termination of the pressurization section 210 becomes smaller than it.

[0009]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the connector for flexible substrates of this invention Housing in which the path of insertion of a flexible substrate was made the cross direction, and the upper part carried out opening, Two or more contacts which have the contact segment and lead terminal strip in which the contact surface which is prolonged towards the front from the back of this housing, and is electrically connected with a flexible substrate at that tip was prepared, and were attached in said housing from the back side, The lever which is supported free [rotation] above said housing, and presses and fixes said flexible substrate to this housing in a predetermined rotation location, since — it being constituted, and, when side view of the connector equipped with a flexible substrate is carried out It is the process in which the projection (A) whose contact surface of contact, center of rotation of a lever, and lever press a flexible substrate to a contact surface in a contact cross section is located on the same straight line, and equips with a flexible substrate. In the cross section of the both ends of between two or more contacts or a contact county, the projection (B) of a lever is located outside said straight line before rotation of a lever. It contacts so that it may get over to the field established in housing before and after starting rotation and exceeding said straight line, and it is characterized by being located inside the account straight line of rotation termination back to front. Moreover, it is characterized by preparing in a lever the projection (A) which presses a flexible substrate in contact, and the projection (B) which contacts so that it may get over to the field established in housing in the rotation process of a lever.

[0010] Furthermore, the connector for flexible substrates of this invention Housing in which the path of insertion of a flexible substrate was made the cross direction, and the upper part carried out opening, Two or more contacts which have the contact fixed piece and lead terminal strip in which the contact surface which is prolonged towards the front from the back of this housing, and is electrically connected with said flexible substrate at that tip was prepared, and a piece of elastic support, and were attached in said housing from the back side, the lever which is supported free [rotation] above said housing, and presses and fixes said flexible substrate to this

housing in a predetermined rotation location -- since -- it is constituted and said contact has two contact surfaces electrically connected with said flexible substrate. As for the center of rotation of the lever which presses and fixes a flexible substrate, and said two contact surfaces, being arranged at the physical relationship of an isosceles triangle is desirable.

[0011]

[Embodiment of the Invention] The gestalt of operation of the 1st of this invention is explained with reference to drawing 1 -- drawing 6 below. Drawing 1 is drawing showing the whole connector configuration for flexible substrates of the gestalt of this operation, and the connector 301 consists of housing 302, contact 310, and each part material of a lever 320. Moreover, the sectional side elevation showing the process which drawing, drawing 3 , and drawing 4 which show the condition that drawing 2 attaches contact 310 press the flexible substrate 325 to a connector 301, and is fixed, drawing in which drawing 5 shows the pad section 326 of the flexible substrate 325, and drawing 6 graph-ize the operating physical force of the lever 320 in the process which presses the flexible substrate 325 to a connector 301, and is fixed to it.

[0012] drawing 1 -- being shown -- as -- housing -- 302 -- a pedestal -- (-- A --) -- 303 -- the -- both sides -- preparing -- having had -- a pedestal -- (-- B --) -- 304 -- and -- a side attachment wall -- the section -- 305 -- from -- constituting -- having -- the upper part -- opening -- having carried out -- a configuration -- becoming -- **** . And the slit section 306 of a large number deeply cut from back is formed in the pedestal (A) 303.

[0013] As shown in drawing 1 and drawing 2 , contact 310 is inserted in the slit section 306 of housing 302 from the back side of housing 302. As shown in drawing 2 , contact 310 is led with a contact segment 311 and the fixed piece 312. In addition to the terminal strip 313, it has the piece 314 of elastic support above the contact segment 311, and as shown in drawing 4 (A), it has the structure where a contact segment 311 and the fixed piece 312 put the heights 308 of housing 302 from the upper and lower sides in the condition of having inserted into housing 302. Furthermore, the tip of the piece 314 of elastic support has the smooth curve side, and is supporting it for the lever 320 which this part mentions later, enabling free rotation. Moreover, the contact surface 315 for the tip top face of a contact segment 311 to contact electrically the pad section 326 of the flexible substrate 325 shown in drawing 5 is formed.

[0014] A lever 320 serves as a lid of the wrap housing 302 in the flexible substrate 325 while it presses and fixes the flexible substrate 325 to the contact surface 315 of contact 310 by making it rotate after it is supported free [rotation] above housing 302 to a bearing 307 and the piece 314 of elastic support of contact 310 and sets the

flexible substrate 325 to the position on housing 302 as shown in drawing 1 and drawing 4 (A). Drawing 4 (A) As shown in - (C), the curved stop section 321 is formed, and when the tip of the piece 314 of elastic support of this stop section 321 and contact 310 fits in, the lever 320 is supported by the rotation core side of a lever 320 free [rotation] centering on the tip of the piece 314 of elastic support.

[0015] On the other hand, as shown in drawing 5 , much pad sections 326 for contacting the contact surface 315 of contact 310 electrically are formed in the rear face of the flexible substrate 325.

[0016] Next, drawing 3 and drawing 4 are used and the process which presses the flexible substrate 325 to a connector 301, and is fixed to it is explained in order.

Drawing 3 is the cross section of the both ends of contact 310 group. First, as shown in drawing 3 (A), where a lever 320 is opened, the flexible substrate 325 is inserted.

Then, after rotation of a lever 320 starts as shown in drawing 3 (B), projection (B) 323 contacts a pedestal (B) 304, the piece 314 of elastic support bends upwards and the amount reaches a peak, bending of the piece 314 of elastic support is restored, it will be in the condition which shows in drawing 3 (C), and wearing will be completed.

Drawing 4 is the cross section of contact 310. First, as shown in drawing 4 (A), where a lever 320 is opened, the flexible substrate 325 is inserted. then -- drawing 4 -- (-- B --) -- being shown -- as -- a lever -- 320 -- rotation -- starting -- although -- a projection -- (-- A --) -- 322 -- a projection -- (-- B --) -- 323 -- physical relationship -- from -- flexible -- a substrate -- 325 -- contacting -- things -- there is nothing -- as -- elastic support -- a piece -- 314 -- the upper part -- bending -- drawing 4 -- (-- C --) -- being shown -- a condition -- becoming -- wearing -- completing .

[0017] The operating physical force of the lever 320 in the process which presses the flexible substrate 325 to a connector 301, and is fixed to it is explained using drawing 6 (A) and (B). First, it sets in the both-ends cross section of contact 310 group which ****3****(ed) . Lever control force begins to occur from the time of rotation of a lever 320 starting and projection (B) 323 contacting a pedestal (B) 304. Furthermore, it begins to go up with rotation of a lever 320, descent starts bordering on the time of projection (B) 323 reaching on the straight line which connects the contact surface 315 of contact 310 to the lever center of rotation, and rotation of a lever 320, i.e., wearing of the flexible substrate 325, is completed by the middle. On the other hand, in contact 310 cross section shown in drawing 4 Although the projection (A) 322 approaches the flexible substrate 325 with rotation of a lever 320, do not contact according to physical relationship with projection (B) 323, and it goes on. the projection (A) from from [just before projection (B) 323 passes the straight line which

connects the contact surface 315 of contact 310 to the lever center of rotation in drawing 3 and rotation of a lever 320 is completed] -- 322 -- the flexible substrate 325 -- contacting -- beginning -- It goes up gradually and rotation of a lever 320, i.e., wearing of the flexible substrate 325, is completed. therefore, the lever control force as a connector -- drawing 3 and drawing 4 -- it is possible that the lever control force which each observed was doubled, and becomes a characteristic ray with the self lock effectiveness.

[0018] In addition, even if it prepares the pedestal (B) prepared in the both sides of a contact group as application of an operation gestalt between the contacts which have more than one and prepares a projection (A) and projection (B) of a lever in the location corresponding to a pedestal (B), of course, the same effectiveness is acquired.

[0019] Next, the gestalt of operation of the 2nd of this invention is explained with reference to drawing 7 . Drawing 7 (A) - (C) is the sectional side elevation of the contact part which shows the process which presses and fixes the flexible substrate 425 to the connector 401 of the connector for flexible substrates of the gestalt of operation of the 2nd of this invention. As shown in drawing 7 (A), as for contact 410, a connector 401 has the piece 414 of elastic support above the contact fixed piece 411, the lead terminal strip 412, and the contact fixed piece 411 by carrying out two or more insertion of the contact 410 from the back of housing 402, and (contact-surface A) 415a and (contact-surface B) 415b are further prepared in the contact fixed piece 411. As for the core of the revolving shaft 416 at the tip of the piece 414 of elastic support, (contact-surface A) 415a, and contact-surface B415b, it is desirable to be prepared in the physical relationship which makes an isosceles triangle.

[0020] A lever 417 is supported above housing 402 free [the rotation to the revolving shaft 416 of the piece 414 of elastic support], and has the flat part 418 and projection 419 which press the flexible substrate 425 against (contact-surface A) 415a and (contact-surface B) 415b after rotation of a lever 417. The flexible substrate 425 is inserted in the connector 401 where a lever 417 is opened, and it is the initial stage of the process pressed and fixed. Next, as shown in drawing 7 (B), after it rotates sagging the piece 414 of elastic support upwards and projection 419 overcomes (contact-surface A) 415a and (contact-surface B) 415b, bending of the piece 414 of elastic support is recovered slightly, and will be in the condition of drawing 7 (C), and a series of actuation will complete a lever 417. in addition -- this -- the -- two -- operation -- a gestalt -- ***** -- a connector -- flexible -- a substrate -- press -- immobilization -- carrying out -- a process -- being shown -- contact -- a group -- an outside -- a sectional side elevation -- being shown -- **** -- although --

these -- the -- one -- operation -- a gestalt -- having been shown -- drawing 3 --
(-- A --) - (-- C --) -- a sectional side elevation -- being the same -- since --
illustration and explanation -- omitting .

[0021]

[Effect of the Invention] As mentioned above, contact force is acquired by sagging the piece of elastic support of the contact which takes the lead in the lever rotation at the time of equipping with a flexible substrate, as explained to the detail. Moreover, two, a projection (A) and a projection (B), are shifted and prepared in the direction of an angle of rotation of a lever at a lever. By having given the function to give the function which pushes a flexible substrate against the contact of contact to a projection (A), and to make a projection (B) contact with a housing pedestal (B) and tightness cost The lever operating-characteristics line for acquiring the self clock effectiveness can be obtained through a flexible substrate only by two configuration members, the pedestal (B) of housing, and the projection (B) of a lever.

[0022] Furthermore, even when not setting up the maximum contact force which can set up the maximum contact force which can permit a flexible substrate at the time of lever actuation termination, can secure and maintain a connector property on higher level, or can permit a flexible substrate by it, adding excessive stress to a flexible substrate is lost, and reinforcement of the count of repeat wearing of a flexible substrate and improvement in environment-resistant ability can be aimed at.

[0023] Moreover, two or more contacts which have the contact fixed piece and lead terminal strip in which the contact surface by which the upper part extends towards the front from the back of housing which carried out opening, and this housing, and is electrically connected with a flexible substrate at that tip was prepared, and were attached in housing from the back side, It is constituted. the lever which is supported free [rotation] above housing, and presses and fixes a flexible substrate to this housing in a predetermined rotation location -- since -- contact When it has two contact surfaces electrically connected with a flexible substrate and the center of rotation of a lever and two contact surfaces which are pressed and fixed arrange a flexible substrate to the physical relationship of an isosceles triangle When the force of the one half of the force generated from the center of rotation and the force which said two contact surfaces receive, i.e., the contact force per one contact surface, will be in equilibrium according to the physical relationship of an isosceles triangle, while the self clock effectiveness is acquired Even if it cannot set up the maximum contact force which can permit a flexible substrate at the time of lever actuation termination, by having prepared two contact surfaces per 1 contact, environment-resistant ability can be raised greatly and high-reliability can be secured.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective view showing the whole connector configuration for flexible substrates which is the gestalt of operation of the 1st of this invention.

[Drawing 2] It is the perspective view showing the condition before attaching contact to the connector of the gestalt of operation of the 1st of this invention.

[Drawing 3] (A) – (C) is the sectional side elevation of the outside of a contact group showing the process which presses a flexible substrate to the connector of the gestalt of operation of this invention, and is fixed to it.

[Drawing 4] (A) – (C) is the sectional side elevation of a contact part showing the process which presses a flexible substrate to the connector of the gestalt of operation of the 1st of this invention, and is fixed to it.

[Drawing 5] It is the rear-face Fig. showing the flexible substrate linked to the connector of this invention.

[Drawing 6] (A) and (B) are drawings showing angle of rotation of the lever of the connector of this invention, and the relation of the operating physical force of a lever.

[Drawing 7] (A) – (C) is the sectional side elevation of a contact part showing the process which presses a flexible substrate to the connector of the gestalt of operation of the 2nd of this invention, and is fixed to it.

[Drawing 8] (A) – (C) is the sectional view showing the process in which it equips with the flat cable of the conventional connector.

[Drawing 9] It is the sectional view of other conventional connectors.

[Drawing 10] It is drawing showing the relation of the operating physical force of the lever of the conventional connector, angle of rotation of a pressurization member and a lever, or a pressurization member.

[Description of Notations]

301,401 Connector for flexible substrates

302,402 Housing

303 Pedestal (A)

304 Pedestal (B)

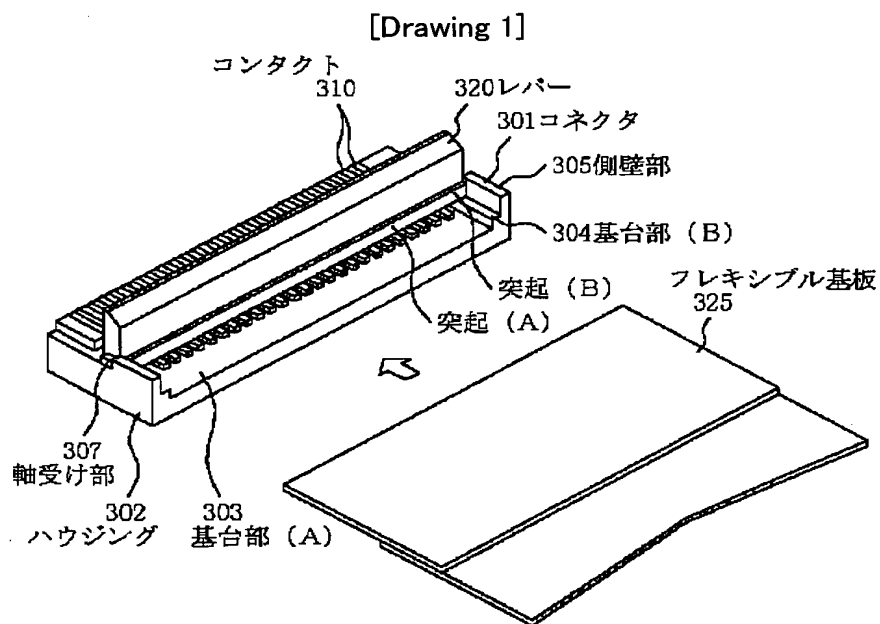
305 Side-Attachment-Wall Section

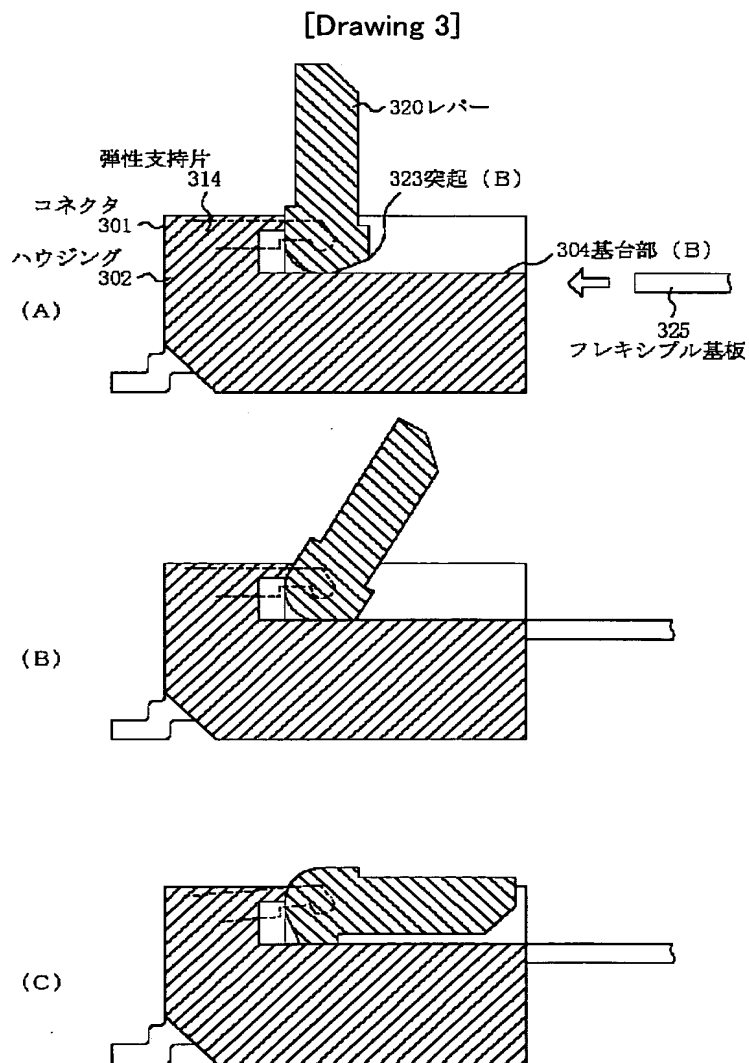
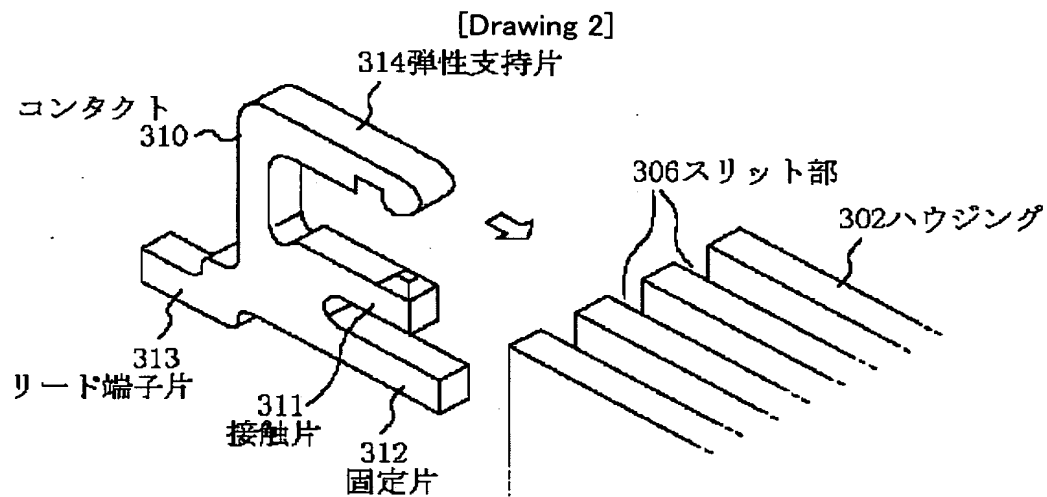
306 Slit Section

307 Bearing

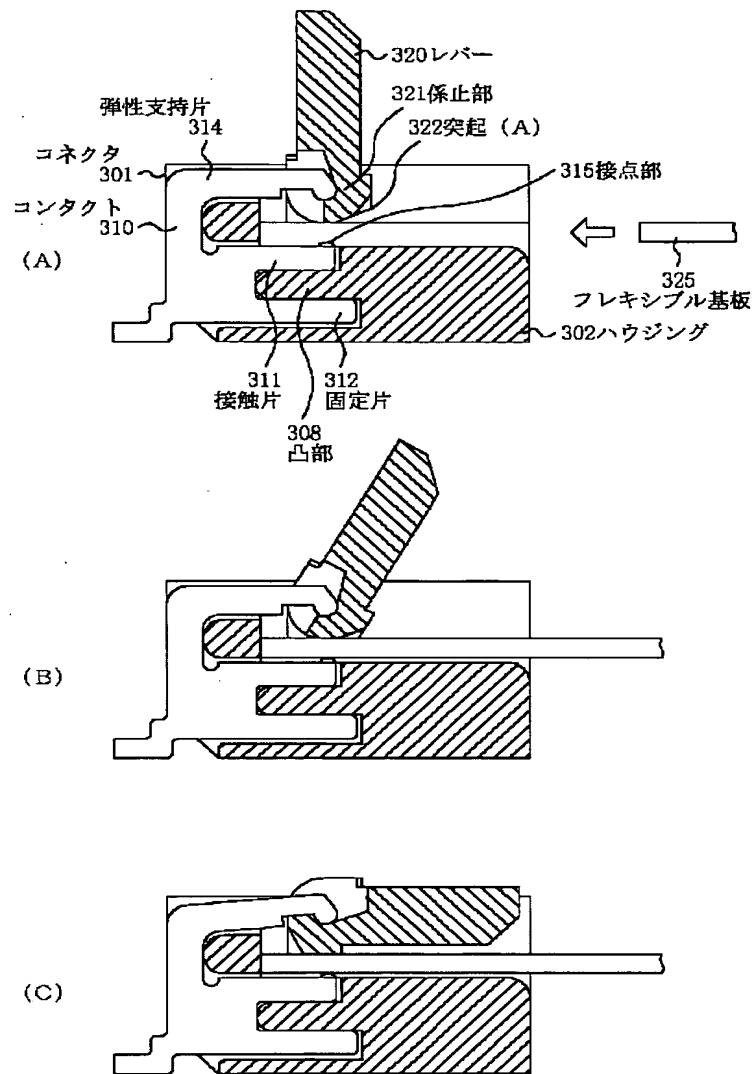
308 Heights
310,410 Contact
311 Contact Segment
312 Fixed Piece
313,412 Lead terminal strip
314,414 Piece of elastic support
315 Contact Surface
320,417 Lever
321 Stop Section
322 Projection (A)
323 Projection (B)
325,425 Flexible substrate
411 Contact Fixed Piece
415a Contact surface (A)
415b Contact surface (B)
416 Revolving Shaft
418 Flat Part
419 Projection

DRAWINGS

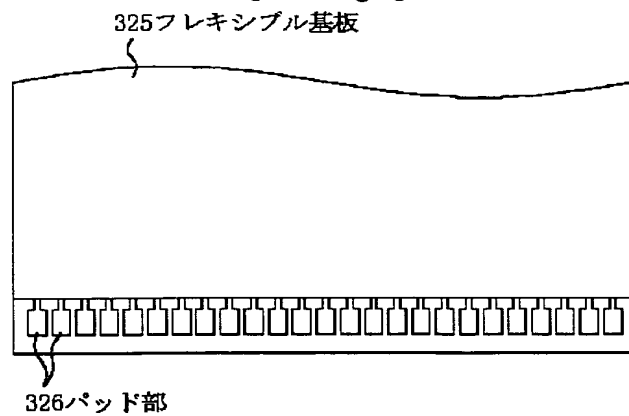




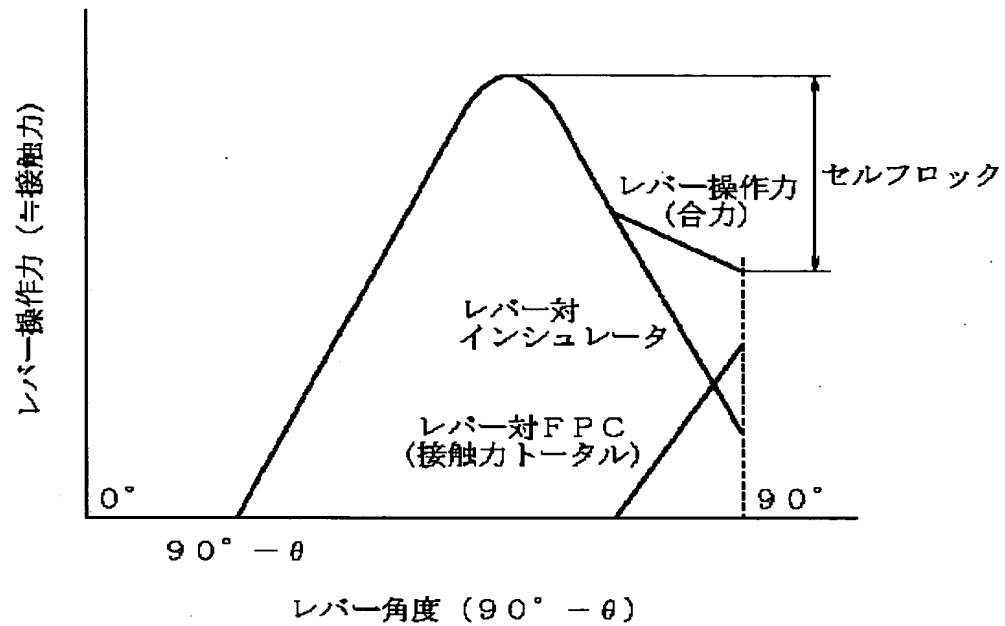
[Drawing 4]



[Drawing 5]



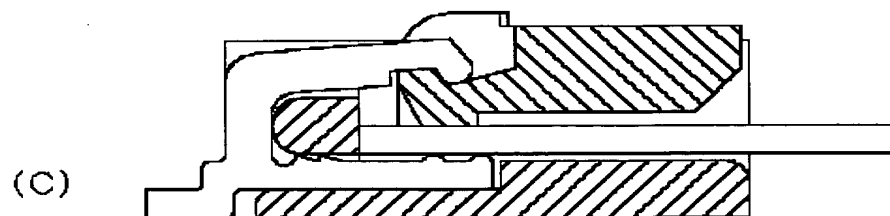
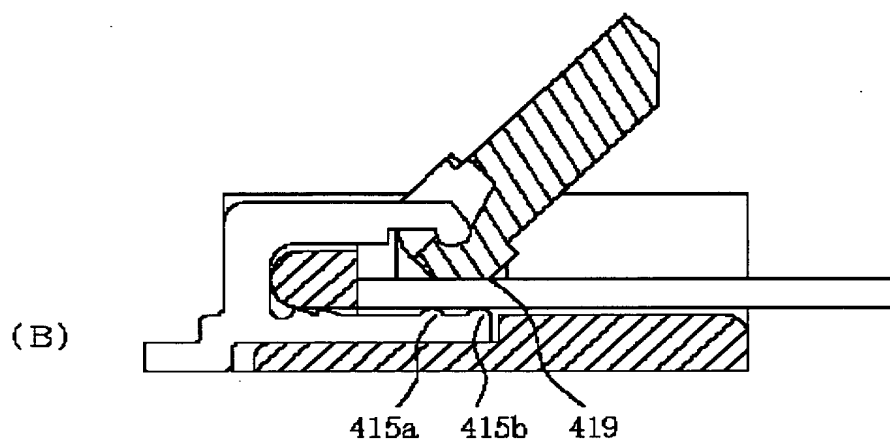
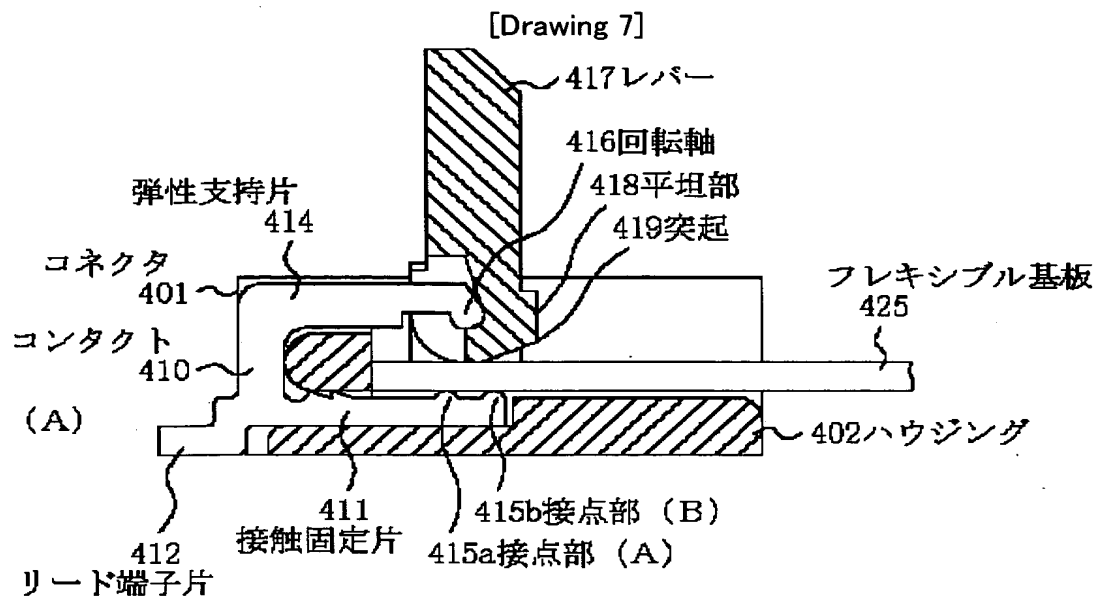
[Drawing 6]



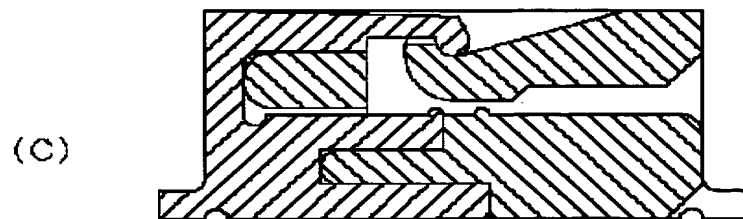
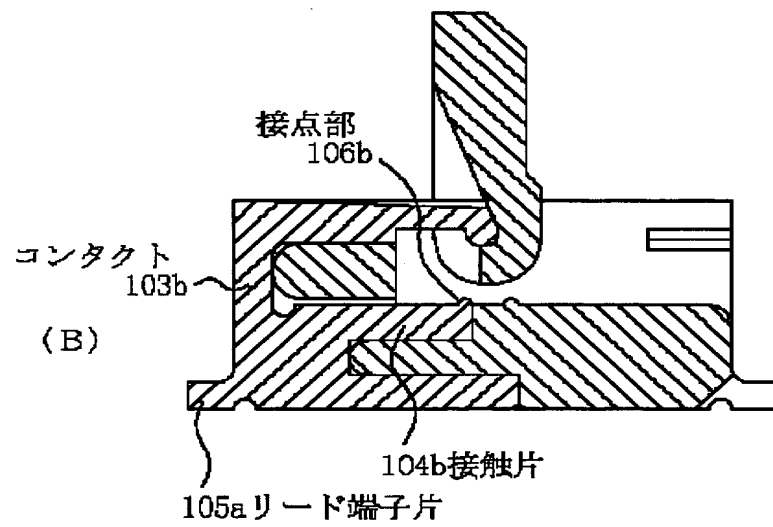
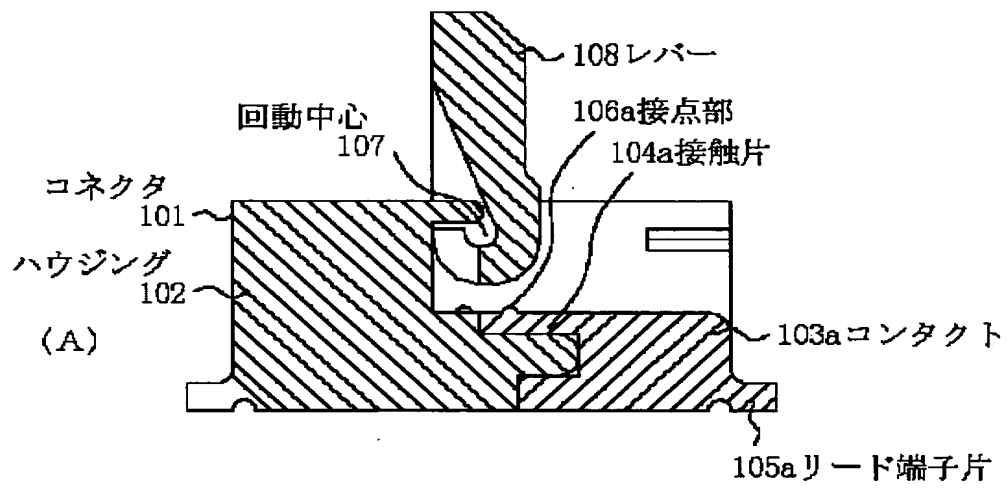
(A)

| | レバー対インシュレータ断面 | レバー対FPC断面 (接触力) |
|---------------------------------|---------------|-----------------|
| レバー操作力 発生角 [θ_0] | | |
| レバー操作 完了角 [0°] | | |

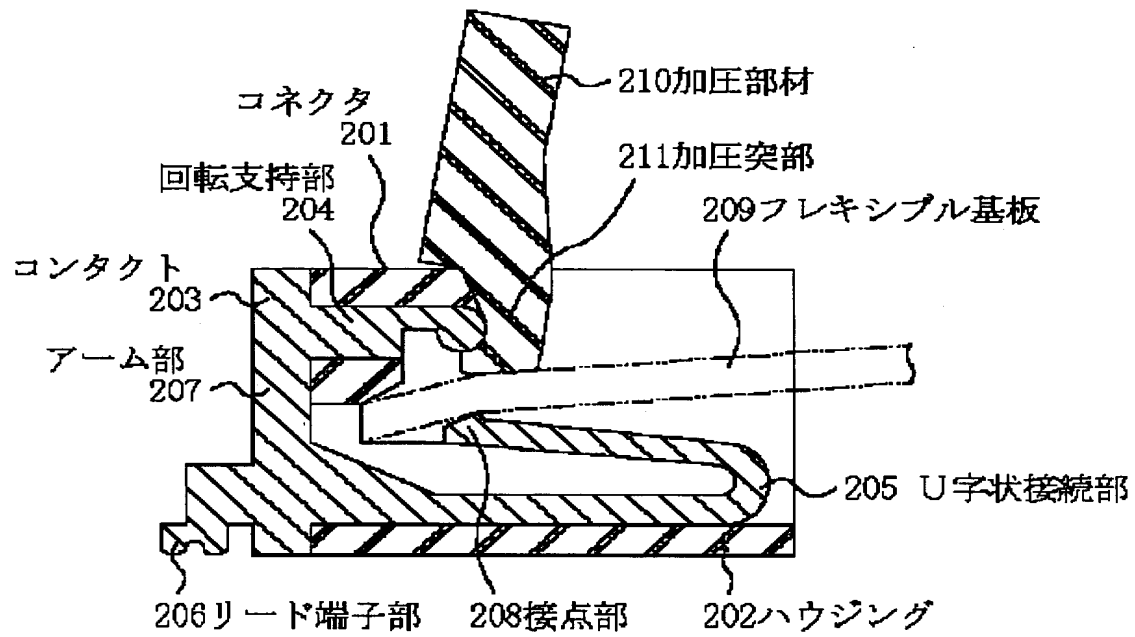
(B)



[Drawing 8]



[Drawing 9]



[Drawing 10]

